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DRAFT WORK PLAN

OPERABLE UNIT FEASIBILITY STUDY
FOR
GALENA SUBSITE SURFACE WATER

Cherokee County Site
102-7L37/W68540

July 8, 1987

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CH2M HILL
Engineers
Planners
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July 8, 1987

W65542.WP

Ms. Alice Fuerst
U.S. Environmental Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, Kansas 66101

Dear Ms. Fuerst:

We have enclosed for your review and comment the Draft Work Plan for the Surface Water Operable Unit Feasibility Study (OUFS) for the Galena Subsite. A cost estimate is included, showing details for each Task and a summary for the OUFS.

The draft work plan includes the results of discussions to date on scope and extent of this OUFS. Our preliminary interpretation of these discussions is that we should analyze all those areas that drain, by point or nonpoint sources, the mine working areas in and around Galena. This OUFS will also re-evaluate remedial alternatives from the groundwater OUFS with respect to their effectiveness in meeting surface water system goals and objectives. This latter step will be the integration process between the two OUFS's.

We look forward to discussing this proposed work program with you later this month and incorporating your comments into the final workplan.

Sincerely,

Richard Moos

Richard Moos
SPM, Cherokee County Site

DE/CC7/012sh
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Section 1
INTRODUCTION

The National Contingency Plan (NCP) provides that implementation of operable units can and should begin before selection of an appropriate final remedial action, if such measures are cost-effective and consistent with a permanent remedy [NCP 300.68(c)(3)]. An operable unit, as defined by the NCP, is a discrete part of the entire response action that decreases a release, threat of release, or pathway of exposure.

Development of the Galena subsite surface water operable unit feasibility study (OUFS) work plan has been based on instructions from the U.S. Environmental Protection Agency (EPA) Region VII, requirements of the National Contingency Plan, guidance on feasibility studies under CERCLA (April 1985) and requirements of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This work plan discusses the purpose of the OUFS; delineates specific tasks and subtasks that will lead to EPA selection of an operable unit remedial action; and presents task scopes, schedule (including deliverables), and estimated budget costs.

PURPOSE

This work plan presents the scope, schedule, and estimated cost for the tasks required to complete an OUFS on the Galena subsite surface water system. The Galena subsite is part of the Cherokee County Superfund site in extreme southeastern Kansas. This Galena subsite surface water OUFS is the second OUFS to be undertaken at this site. Region VII is continuing to assess the need for other OUFS's at other subsites and the need for additional work at Galena. Figure 1-1 is a schematic plan for the Galena subsite as it is currently understood.

This OUFS is a development and evaluation of potential response actions that address a specific site problem. The response actions must be capable of implemention prior to final action, and compatible with the final site remedy. This OUFS will focus on remedial alternatives for the mitigation and/or correction of heavy metals contaminated surface water at the Galena subsite.

SITE BACKGROUND

CHEROKEE COUNTY SITE

The Cherokee County site represents the Kansas portion of the Tri-State Mining District. This mining district was one

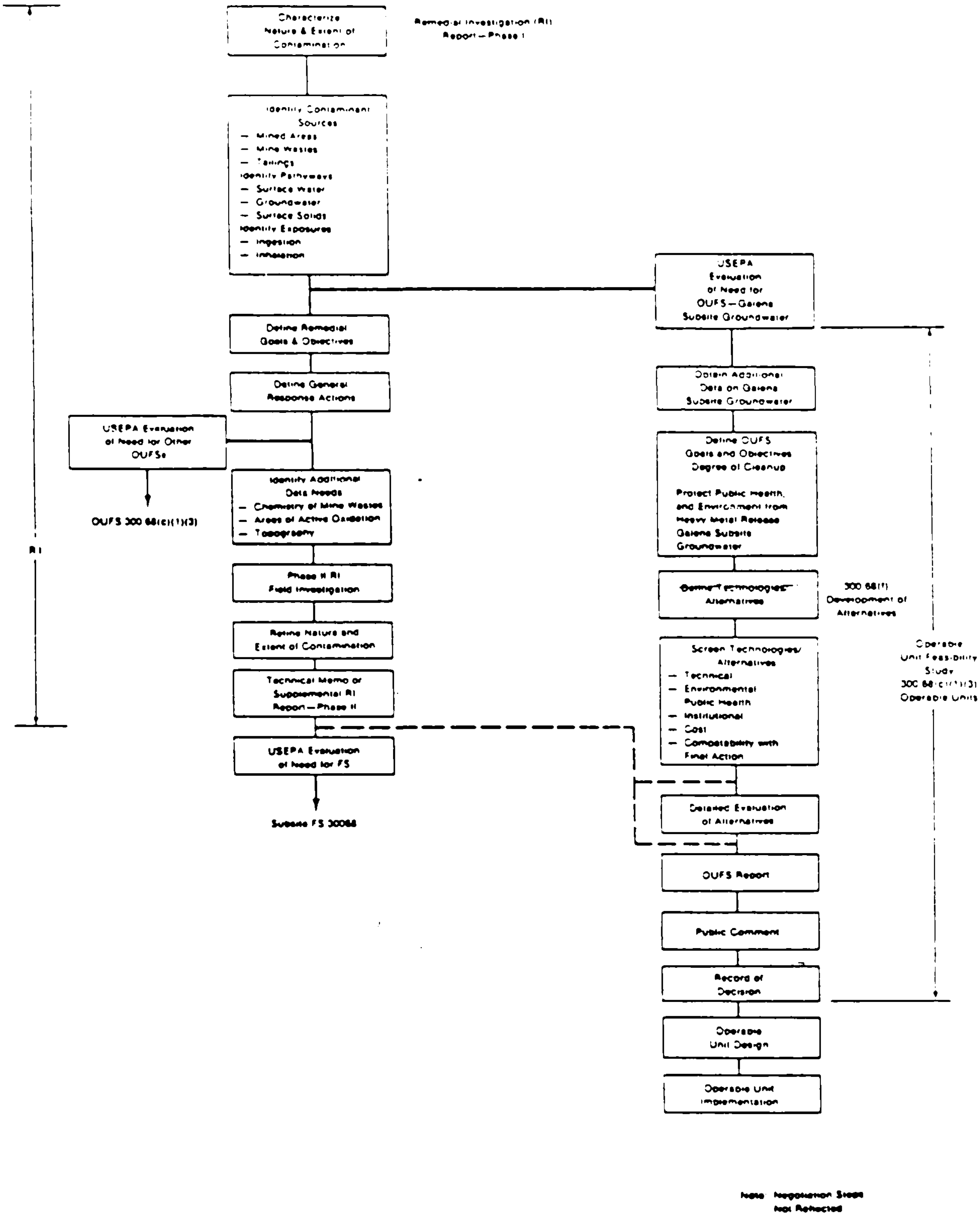

FIGURE 1-1
PROJECT SCHEMATIC
CHEROKEE OUFS—GALENA
SUBSITE SURFACE WATER

of the richest lead and zinc ore deposits in the world and covered about 500 square miles in Oklahoma, Kansas, and Missouri.

Because of the large size of the project area, the Cherokee County site was divided into six subsites with a total combined area of 25 square miles. These subsites were designated as areas near Galena, Badger, Baxter Springs, Lawton, and Treece, Kansas; and Waco, Missouri (Figure 1-2). The EPA directed that work start at the Galena subsite for the following reasons:

- The subsite is one of the more heavily populated areas in the site. The city of Galena, with a population of approximately 3,600, is near the center of the subsite.
- Most types of mining activities including milling and smelting occurred at Galena.
- Residual heavy metal sources are common in this early mining site.
- Prior studies had produced some data for this area.

Ore was first discovered in the Tri-State Mining District in 1848. The first significant mine in Kansas was in Galena, where ore was discovered in 1876. A smelter was built near Short Creek in the 1890's. The general area of the original smelter was used continuously for smelting facilities until around 1961, when the facility was converted to produce sulfuric acid for use by adjacent industries.

Lead and zinc mining flourished in Cherokee County from the late 1800's through the 1940's. The peak production year within the Cherokee County site was 1926, when 28,000 tons of lead and 126,000 tons of zinc were produced. Mining activity decreased in the 1950's and many of the mines were closed. There was a short resurgence in the 1960's, but area mining ended when the Swalley Mine near Baxter Springs, the last major commercial mine, closed in 1970.

GALENA SUBSITE

The Galena subsite in Cherokee County, Kansas is situated approximately 7 miles west of Joplin, Missouri. Access to the subsite is by U.S. Route 66 west of Joplin, Missouri or Interstate 44.

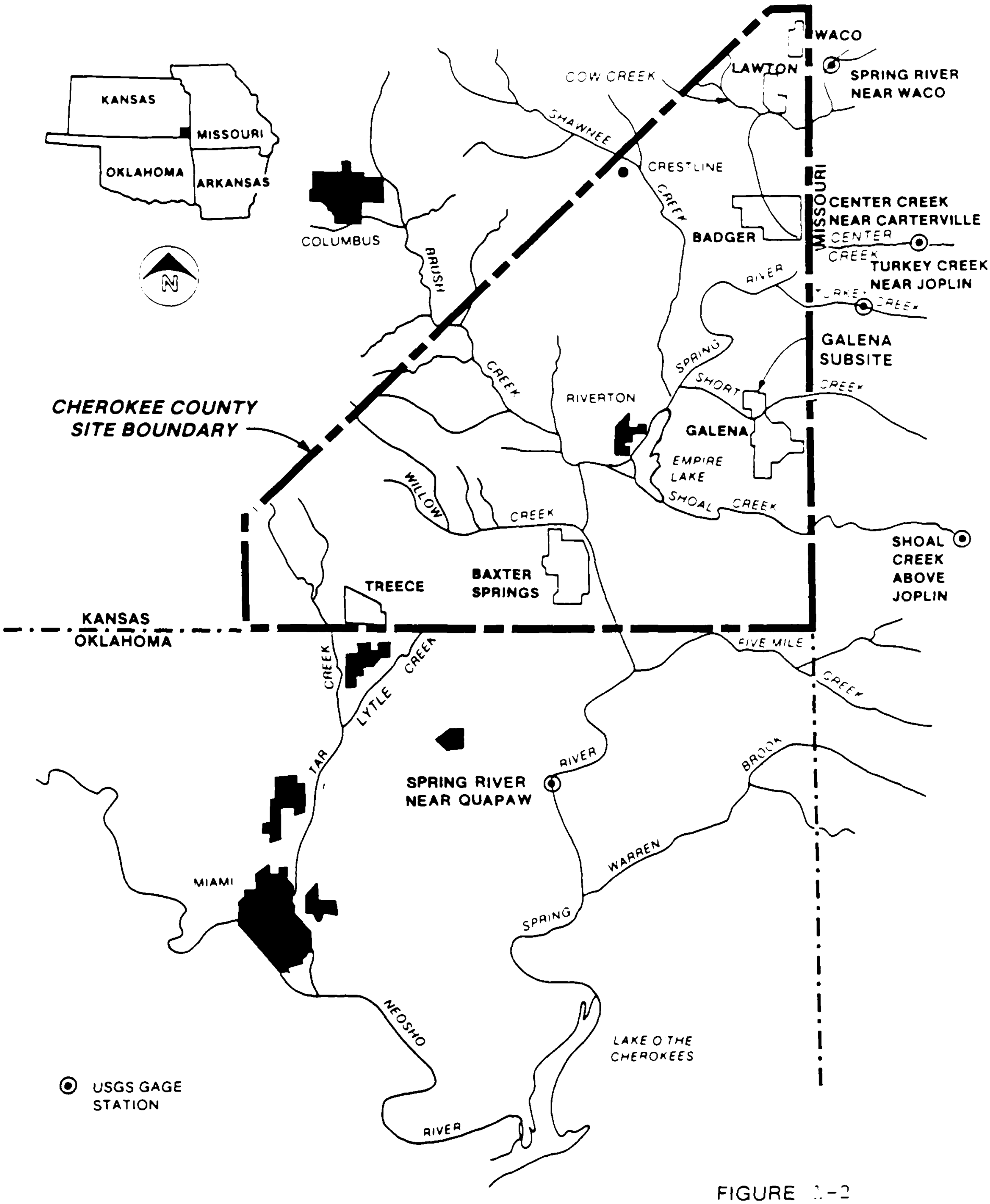

FIGURE 1-2
LOCATIONS OF SUBSITES AND USGS GAGE STATIONS
CHEROKEE COUNTY SITE

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The Galena subsite is a 9-square-mile area in the east central portion of the Cherokee County site (Figure 1-2). The subsite is centered around the city of Galena, a residential community of 3,588 (1980 U.S. Census), and includes the oldest lead and zinc mining activity in Kansas. Galena (lead sulfide) and sphalerite (zinc sulfide) were the important commercial ore minerals. However, pyrite and marcasite, both iron disulfides, are commonly found in association with the lead and zinc minerals. Although the sphalerite mined in Tri-State District was an important source of cadmium and germanium, which was produced as a by-product of the lead-zinc smelting process, the Galena subsite was mined before the by-product production and economic potential were realized. As a result, much of the cadmium and germanium was left behind in the mine wastes.

Ore deposits in the Galena vicinity occur in veins and are closer to the surface than in the western portions of the Tri-State District. These shallow depths, typically 80 to 100 feet, but as deep as 185 feet, allowed numerous small mining operations to prosper. Due to the relatively thin cover, exploration and mine development were accomplished by excavating vertical shafts to locate the ore body.

Mining progressed outward from the vertical shafts using a modified room and pillar method to follow the ore vein. Using vertical shafts for mineral exploration and subdividing leases into small subleased mining plots resulted in a high density of mine shafts in Galena compared with outlying areas. Almost 3,000 shafts have been located in the Galena subsite area (McCauley et al., 1983). Of this number, many remain open at the surface.

Some underground excavations were large and interconnections between mines may have been common. Several underground mines have collapsed, forming subsidences of varying shapes and sizes. Many circular subsidences are less than 75 feet in diameter, while others, from circular to rectangular, measure several hundred feet along the longest dimension. Observed ground level differences of 20 to 40 feet are common in the subsidences around Galena, but some are filled with water and may be deeper.

The most obvious remains of the intense mining activity are the mine and mill wastes that cover large areas surrounding Galena, the open mine shafts, and the water-filled subsidence craters. The local term for the gravel-sized waste rock that resulted from the early ore milling process is "chat," while large chunks of unmilled waste rock derived from the excavation of vertical shafts are termed "bullrock." The mine-waste areas are generally unvegetated because of an apparent lack of a suitable soil horizon.

ENVIRONMENTAL SETTING

PHYSIOGRAPHY OF THE GALENA SUBSITE

The Galena subsite, as well as most of the Cherokee County site east of Spring River, lies in the Ozark Plateau physiographic province. The Ozark Plateau province in Kansas developed on cherty limestone of Mississippian age. These are the oldest exposed rocks in the State of Kansas and contain the deposits of lead and zinc ore mined in this area (McCauley et al., 1983). The local topographic relief exceeds 170 feet in the area of the Galena subsite, with the steepest slopes occurring adjacent to the flood plains of Shoal Creek and Spring River.

GEOLOGY

The geologic section for Cherokee County includes rocks of Mississippian age and older. A generalized stratigraphic section is presented in Table 1-1. The Ordovician and Mississippian strata are of greatest interest to this OUFS. The Ordovician rocks are largely dolomites and sandy dolomites and contain the deep regional confined aquifer, which is most commonly referred to as the Roubidoux Formation. The Mississippian sediments are shales near the base of the section and cherty carbonates higher in the section that contain the shallow aquifer.

In the Galena area, the confining aquitard above the deep aquifer is composed of approximately 10 feet of the Mississippian shales, while south and west of Galena, in Oklahoma, the Devonian aged Chattanooga Shale is present and becomes a major part of the aquitard.

GROUNDWATER

A review of prior studies indicates that two aquifers exist in the Galena area, a shallow water-table aquifer and a deeper confined aquifer. The environmental classification of both aquifers will need to be determined through the Classification Review Area process.

The shallow aquifer includes the Warsaw Limestone, the Burlington-Keokuk Limestone, and the Fern Glen Limestone. This aquifer is the equivalent of the Boone aquifer in Oklahoma. It is under water-table conditions in the vicinity of the Galena subsite. These limestone strata yield little water in areas where the strata are massive, but in areas where solution channels, breccia, and fractures occur, the yields are adequate to good. The natural ore bodies, peripheral noneconomic mineralization, and mine workings are associated with the Warsaw and Keokum Limestones within the aquifer.

Table 1-1
GENERALIZE STRATIGRAPHIC COLUMN FOR CHEROKEE COUNTY, KANSAS
CHEROKEE COUNTY, GALENA SUBSITE

System	Formation	Lithology	Thickness Range (ft.)
PENNSYLVANIAN	Undifferentiated*	Shales and Sandstones with Coal	0-450*
MISSISSIPPIAN	Undifferentiated*	Limestones, Shales, Siltstones	0-120*
	Shallow Aquifer (Boone Equivalent)		
	Warsaw Limestone	Crinoidal Limestone with Chert	0-180
	Burlington-Keokuk	Coarse crystalline Limestone with Chert	20-240
	Fern Glen Limestone	Upper Portion: Limestone w/Chert Lower Portion: Dolomitic Limestone	120-200
	Aquitards		
	Northview Shale	Calcareous Shale	0-55
	Compton Limestone	Shaley Limestone	0-25
DEVONIAN	Chattanooga Shale*	Black Shale	0-10*
ORDOVICIAN	Cotter-Jefferson City Dolomite	Cherty Dolomite and Sandstone, with Shale partings	170-550
	Deep Aquifer (Roubidoux Equivalent)		
	Gasconade Dolomite	Coarsely crystalline Dolomite, sandy in lower portion	165-320
CAMBRIAN	Eminence Dolomite	Coarse-grained Dolomite with Glauconite and little Chert	120-210
	Bonneterre Dolomite	Medium to fine crystalline dark Dolomite	140-230

*Generally absent in the Galena subsite area.

Note: The Ordovidian strata, plus the Eminence Dolomite, comprise the Arbuckle Group.

Source: Spruill, 1984.

The deep aquifer is generally under confined conditions and is considered to include all the rocks of the Ordovician Arbuckle group. The deep aquifer is the principal source of municipal groundwater supplies in the site area and throughout the Tri-State area. The deep aquifer is known as the Roubidoux Formation or, in Kansas, as the Gasonade Dolomite. The Roubidoux Formation is probably the most productive zone of the deep aquifer. Transmissivity of the Roubidoux ranges up to 27,000 square feet per day (Spruill, 1984).

SURFACE WATER

The Galena subsite is drained by the Spring River, Short Creek, Shoal Creek, and their tributaries (Figure 1-2). Flows in Spring River and Shoal Creek are impounded by two adjacent dams and form Empire Lake to the west of the subsite. The lake is owned by Empire District Electric Company. Water levels on Spring River and Shoal Creek are influenced for significant distances upstream by the backwater effects of Empire Lake. The State of Kansas has given Shoal Creek a use classification for primary contact recreation. In addition, a few subsidences in the subsite are reportedly used for swimming by the local population. Fishing and hunting are common activities on Empire Lake and the Spring River.

Mine wastes influence surface drainage water quality over major parts of the subsite. Natural drainage patterns in many locations are interrupted by mine waste piles and surficial subsidence. The wastes occur in random piles which form an uneven topography that interrupts normal drainage of the slopes and causes ponding of runoff. The ponding of runoff can increase infiltration to the shallow groundwater system. At the periphery of the mine waste piles, the slope is frequently steep and sediment from the mine waste is transported to Short and Shoal Creeks and then to the Spring River. Both the infiltration and sediments are potential sources of metal laden mine wastes to the groundwater and surface water.

SOILS

Much of the Galena study area is mantled by a layer of cherty gravel that resulted from the weathering of the Mississippian limestones. The soils of the area are often thin and rocky (McCauley et al., 1983).

Section 2
NATURE AND EXTENT OF THE PROBLEM

WASTE TYPE, QUANTITY, AND DISTRIBUTION

The mine wastes present in the Galena subsite were generated by mining, milling, and smelting of lead and zinc ores. Mining activities at Galena produced primarily lead while much of the zinc ore, because of its low value at the turn of the century, was left in the milling waste. The mining and milling wastes are composed primarily of chert, a form of silica (SiO_2), or cherty limestone with residual ore minerals. Wastes from the mining and milling processes vary in size from boulders to fine dust and include significant but undefined quantities of sphalerite (zinc sulfide containing cadmium and other trace minerals).

The ores in the Tri-State Mining District are sulfide minerals. Mining in the area has exposed these sulfide ores to oxygen, which creates a geochemically oxidizing environment conducive to dissolution of sulfide minerals and generation of acidity. Acidic metal-laden water, called acid mine drainage (AMD), contaminates the groundwater, and through various pathways (mine wastes, soils, and mine workings) also moves into the surface water. In addition, rainwater moving downward through chat piles, natural ore bodies, and mine wastes that contain residual minerals also generates AMD.

Although the principal minerals in the mining district are lead and zinc sulfides, several other heavy metals, such as cadmium, nickel, and arsenic, may be dissolved in the groundwater and surface water. As a result of the production of AMD, the groundwater and surface water may contain dissolved metals, concentrated enough to be toxic to plants, animals, and man, as defined by Federal Drinking Water Standards and Ambient Water Quality Criteria (AWQC) for protection of aquatic life.

Coarse mine wastes, known as bullrock, represent the large rock removed from vertical mine shafts and exploration holes. The bullrock normally does not contain any significant quantities of residual ore. These bullrock piles now mark the locations of open shafts or shafts that have been filled in or buried. The large piles of pea-sized milling waste, locally called chat, represent the rock left after the milling (grinding) process used to refine the ore in the late 1800's and early 1900's. The chat, depending upon the actual milling or refining process used, contains some residual ore.

The flotation process was not used extensively in the Galena area because mining in that area was greatly curtailed by the early 1920's when the flotation process was introduced.

Therefore, there are no extensive tailings ponds in the Galena subsite.

Slag produced by the smelting operations during the active mining days was usually dumped in large piles near the smelter. The slag piles at the Galena smelter, however, were removed or used to recontour the topography of the smelter site when it was dismantled.

Although no estimates of mine waste are available specifically for the Galena subsite, an estimated 4.6 million short tons of ore were produced in the Galena subdistrict during the period 1911 to 1945 (McCauley et al., 1983). Some of the mine wastes have been reprocessed to extract more ore, or used for concrete aggregate, road construction material, and ballast on railroad beds. In Kansas, about 19 million tons of chat were reportedly used for construction purposes between 1924 and 1969 (Schoewe, 1957; U.S. Bureau of Mines, 1948-1972). As a result of the secondary use of the material, few large chat piles remain in the area around Galena. However, large areas west, north, and northeast of town are covered several feet deep by mine wastes.

Within the Galena subsite, the presence of mine workings and shafts are easily recognized by the surface covering of mine wastes. An estimated 40 to 50 percent of the 9-square-mile subsite area around and including the City of Galena is covered by mining waste materials. The City of Galena is bordered on three sides by mined areas. There are mined tracts that lie entirely within the city limits and many city streets lie adjacent to mined ares, making the mining wastes very accessible to the general public. Some people use the abandoned mine lands as recreational areas, while others dump trash in the mined areas.

The combination of mining methods, the shallow position of the ore body, and the presence of the shallow aquifer in the same strata that contains the ore zone results in acid producing reactions mobilizing heavy metals into and through the shallow groundwater to the surface water.

Most of the horizontal mine tunnels in the Galena area are 50 to 100 feet below the ground surface, although deeper mines have been reported by McCauley et al. (1983). At this depth range, it was economical to operate small mine leases and dig vertical shafts to explore for ore as well as for actual mining. As a result, thousands of mine shafts are located in the Galena area. Also, the shallow mining depths, the fractured nature of the rocks above and peripheral to the ore zone, and the removal of roof support pillars during retreat mining has resulted in numerous cave-ins or subsidences in the area. These subsidences create conduits into the shallow groundwater system. The conduits serve as recharge mechanisms for precipitation moving into the shallow groundwater system.

A lead-zinc smelting facility owned by the Eagle-Picher Company was operated from about 1890 to 1961 in Galena (McCauley et al., 1983). The smelter emissions were a source of air pollution complaints by area residents. The Eagle-Picher plant was shut down in late 1972. Higher than normal levels of lead and zinc in soils downwind of the smelter have been attributed to smelter emissions (Lagerwerff and Brower, 1975).

ENVIRONMENTAL MEDIA POTENTIALLY AFFECTED

The environmental media potentially affected by AMD and dissolved heavy metals migration are groundwater, surface water, stream sediments, and soil. While soil quality is potentially at risk, limited data do not show it to be a problem. The interrelationships are shown diagramatically in Figure 2-1. Figure 2-1 also shows how the analyses of these ongoing processes have been divided between the two OUFS work plans. The groundwater OUFS will deal with the infiltration processes, transport and chemical reactions in the groundwater system, and health effects associated with regional wells. The surface water OUFS will deal with direct runoff processes, base flows in streams (groundwater discharging to surface waters), and health and environmental effects in the surface water system.

Contaminated mine water can flow laterally into the shallow aquifer in unmined areas or may move vertically into the regional deep aquifer. Water percolating through surface mine wastes also may contribute to contamination of the shallow groundwater and surface water systems. The porous nature of the mine wastes and essentially total capture of rainfall because of topographic alterations, increase the infiltration rate to the shallow aquifer. Lateral movement of groundwater in the Galena area is largely unrestricted, but vertical migration from the shallow to the deep aquifer may be restricted by the presence of relatively impermeable rock strata (aquitards) between the aquifers. Both aquifers are used as drinking water sources in the Galena subsite. The deep aquifer is the principal source for Galena and several other municipal water supply systems in Cherokee County.

Streams in the Galena area become contaminated through three basic pathways: lateral movement of contaminated groundwater into streams, surface water runoff from mine waste piles and mine disturbed lands, and contaminated mine water discharges via springs and artesian wells that flow into surface drainages. The main surface drainage through the Galena subsite, Short Creek, is a perennial stream fed by

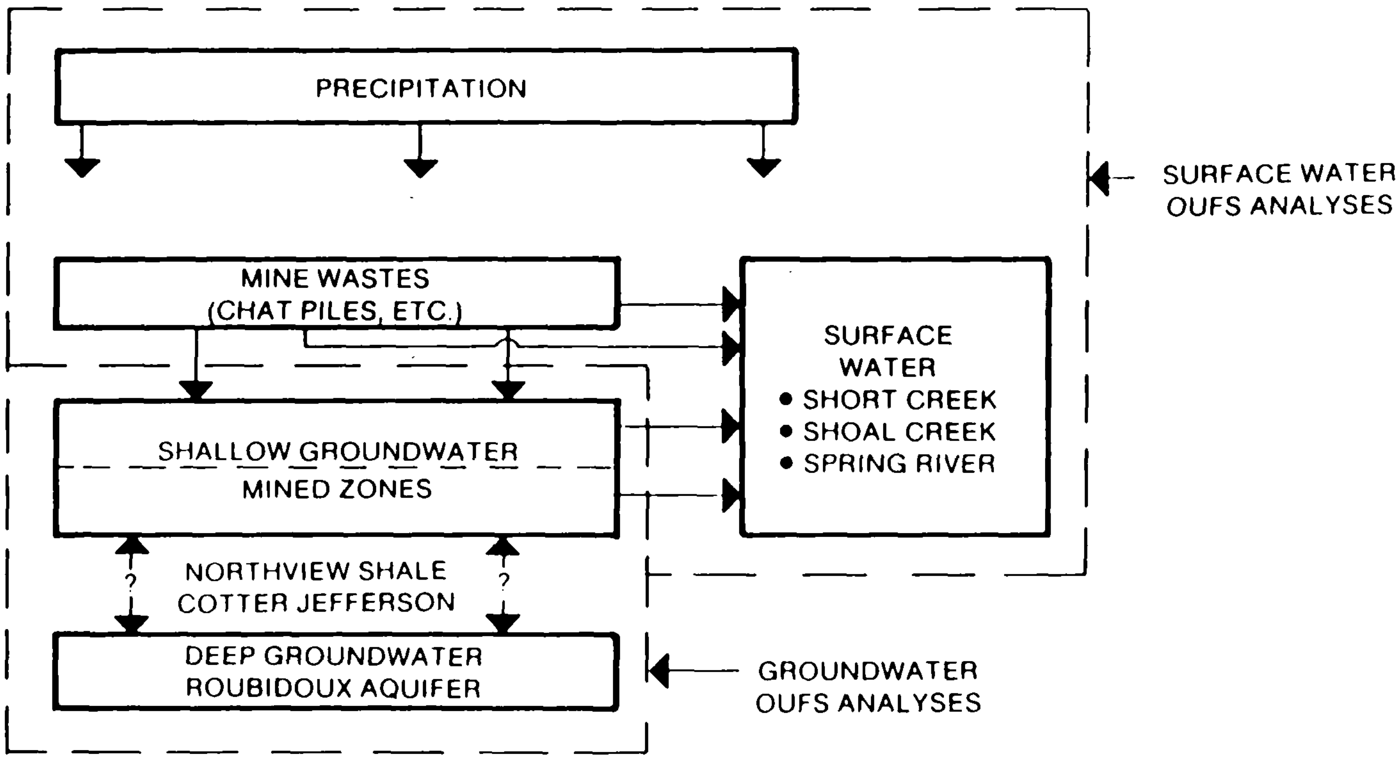

FIGURE 2-1
DEFINITION OF GROUNDWATER AND SURFACE WATER OUFS INTERRELATIONSHIPS WITH OTHER ENVIRONMENTAL MEDIA AT THE GALENA SUBSITE

surface runoff and inflow from the local shallow groundwater system. Surface water runoff during rainfall and snowmelt events from mine waste-covered areas and regions of soil contamination can be a source of stream contamination. Several groundwater discharges are known to exist in the Galena area near surface water drainages. Also, ponded surface waters are located in mined areas where subsidence or surface mining disturbance has occurred. These waters are subject to contamination by direct communication with the mine workings and natural ore bodies.

RESOURCES, POPULATION, OR ENVIRONMENTS POTENTIALLY THREATENED

The potential hazards resulting from past mining activities at the Galena subsite could include the following:

- Contamination of the shallow aquifer (Mississippian unit) could limit or eliminate the use of this water source for residential wells.

- Potential contamination of groundwater in the deep aquifer, the major source of water for public water supplies, could limit or eliminate the use of the water supply for the area's population.

- Contamination of Short Creek, Shoal Creek, and other small surface waters in the subsite could make them unsuitable for fish and other aquatic life, and also for contact recreation such as swimming.

- Use of contaminated water for irrigating crops and watering livestock could affect agriculture, a significant industry in the county since the mines were closed.

- Aquatic biota in Empire Lake, the Spring River, and several area streams have been affected by both contaminated water and contaminated sediments (KDHE, 1980; EPA, 1986).

LIMITATIONS AND ASSUMPTIONS

The Galena Surface Water OUFS and public comment period are expected to be finished in early 1988. Therefore, the limitations imposed by a potential lack of data may require using assumptions to maintain the OUFS schedule. This may introduce uncertainty into the evaluation of alternatives. The project staff will discuss the use of assumptions with EPA, and carefully evaluate their use in lieu of the time and effort required to fill the data gaps.

The existing data base is briefly described in the data base task (Task DB), along with suggestions for developing additional data and filling identified data gaps. These data have been previously described in other reports including the Phase I RI (EPA, 1986a), the Draft Surface Water Technical Memorandum (EPA, 1987b), the Draft Existing Data Report (EPA, 1986b), the September 1986 Draft Sampling Report (EPA, 1986c) and the January 1987 Draft Sampling Report (EPA, 1987a).

The available data were summarized and discussed in the Draft Surface Water Technical Memorandum. Data gaps that could affect the analyses in the Surface Water OUFS include:

- o Lack of water quality data on Short and Shoal Creeks at high flows
- o Lack of water quality data on direct runoff from waste piles
- o Lack of sediment transport information on Short and Shoal Creeks
- o Lack of data on relative runoff contributions from various subbasins in the Short and Shoal creek watersheds

Flow and some water quality data are being gathered currently for selected points in the Short and Shoal Creek basins. Additionally, the current mine waste characterization activities will provide information on the metals content of selected waste piles in the subsite. A high flow sampling episode is scheduled to be performed as soon as weather permits.

The development of the remedial alternatives is directly related to the identification of federal and state applicable or relevant and appropriate requirements (ARAR's) that have not been defined for this work plan. The ARAR's include contaminant-specific, risk-based, ambient concentration limits that are currently being identified by EPA and the Kansas Department of Health and Environment (KDHE). In addition to the contaminant-specific ARAR's, action-specific ARAR's (technology-based restrictions triggered by the type of remedial alternative) will need to be identified as the alternatives are developed. Location-based restrictions or location-specific ARAR's, such as restrictions on developing structures in floodplains, will also be identified as the alternatives are developed. A minimal cost for the development of the ARAR's has been assumed in this work plan.

Section 3
OPERABLE UNIT FEASIBILITY STUDY

This OUFS will screen numerous potential remedial alternatives and present a comparative evaluation of a select set of these remedial alternatives, for mitigating hazards or potential hazards caused by the release of mining-related contaminants to the surface water system draining the Galena subsite area. This system consists of Short Creek, Shoal Creek, and that portion of the Spring River beginning below its confluence with Short Creek and ending with Empire Lake. The upstream areas of the two creeks are terminated at the Kansas/Missouri State line for purposes of this OUFS. This surface water system is believed to intercept the shallow groundwater from the Galena subsite. The shallow groundwater is the base flow for Short and Shoal Creeks, which both flow into Spring River. Sphalerite, present in an acidic environment created by oxidation in both mine waste piles and mine workings, contributes both zinc and cadmium to the shallow groundwater. Figure 3-1 shows the drainage area considered for this OUFS. Figures 3-2, 3-3 and 3-4 present stick diagrams that preliminarily identify subbasins in these drainage areas. Only those drainage areas designated will be analyzed in this OUFS.

This section describes the work plan to be used as the guidance document for completing the surface water OUFS. The OUFS will develop, evaluate, and compare remedial alternatives for mitigating or correcting the surface water contamination in the Galena subsite. The work plan outlines the objectives of the OUFS based on described limitations and assumptions, and describes the tasks proposed to meet these objectives. A proposed schedule of activities and cost estimates for completing the OUFS are included in Section 4. It is expected that Task AE may include a reevaluation of some or all of the remedial alternatives developed by the groundwater OUFS, to adequately evaluate those alternatives that influence both the surface water and groundwater systems.

TASK WP--WORK PLAN PREPARATION

This task includes preparing the draft and final OUFS work plan. A meeting or conference call between EPA and CH2M HILL will be scheduled, if necessary, following review of the draft work plan by Region VII personnel. Following this review, comments will be resolved, revisions made, and the final work plan submitted for EPA approval.

The cost estimate for the work plan preparation task includes costs normally associated with work plan preparation plus costs for project staffing, for discussing and assisting

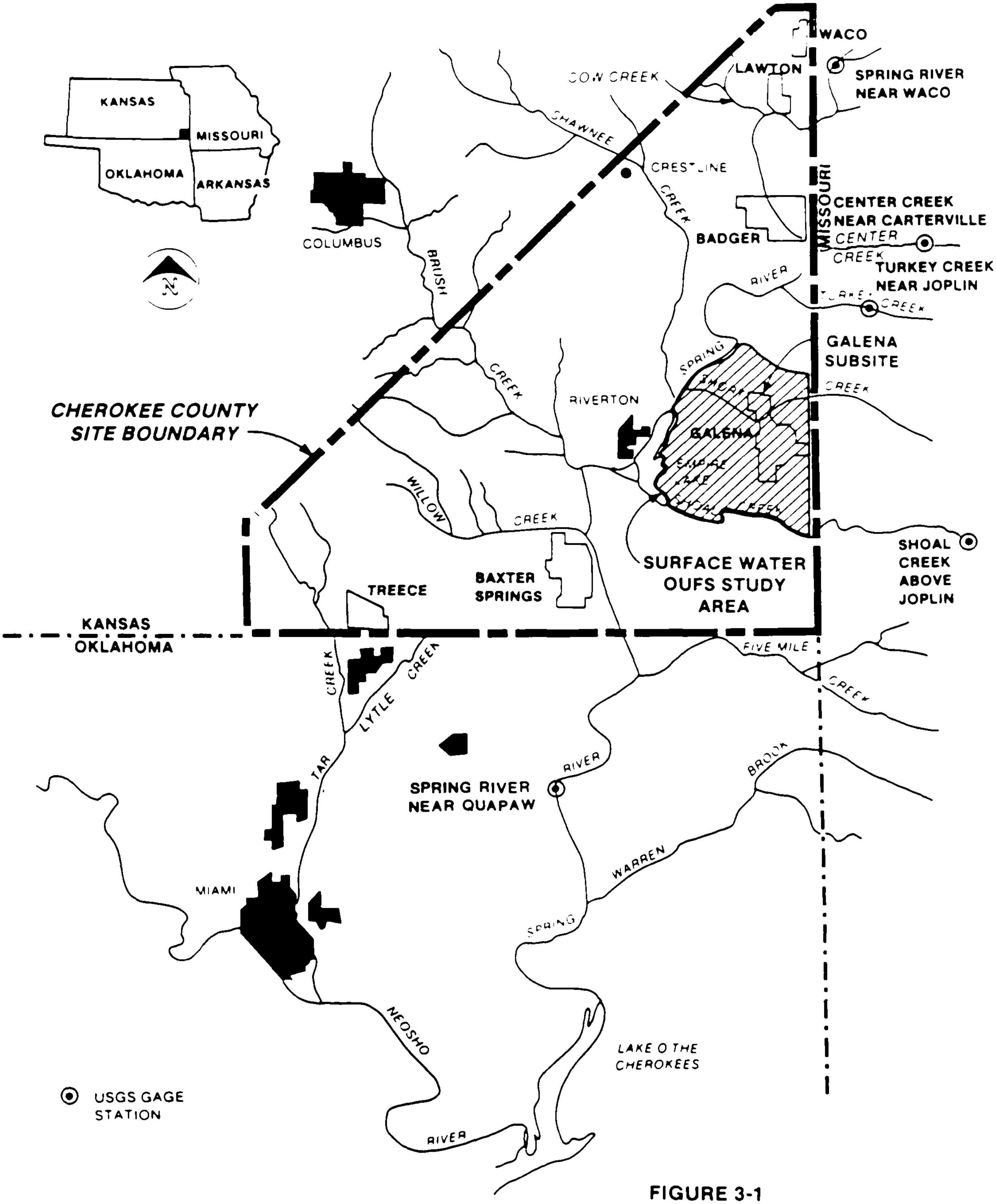

FIGURE 3-1
GALENA SUBSITE
SURFACE WATER OUFS
STUDY AREA

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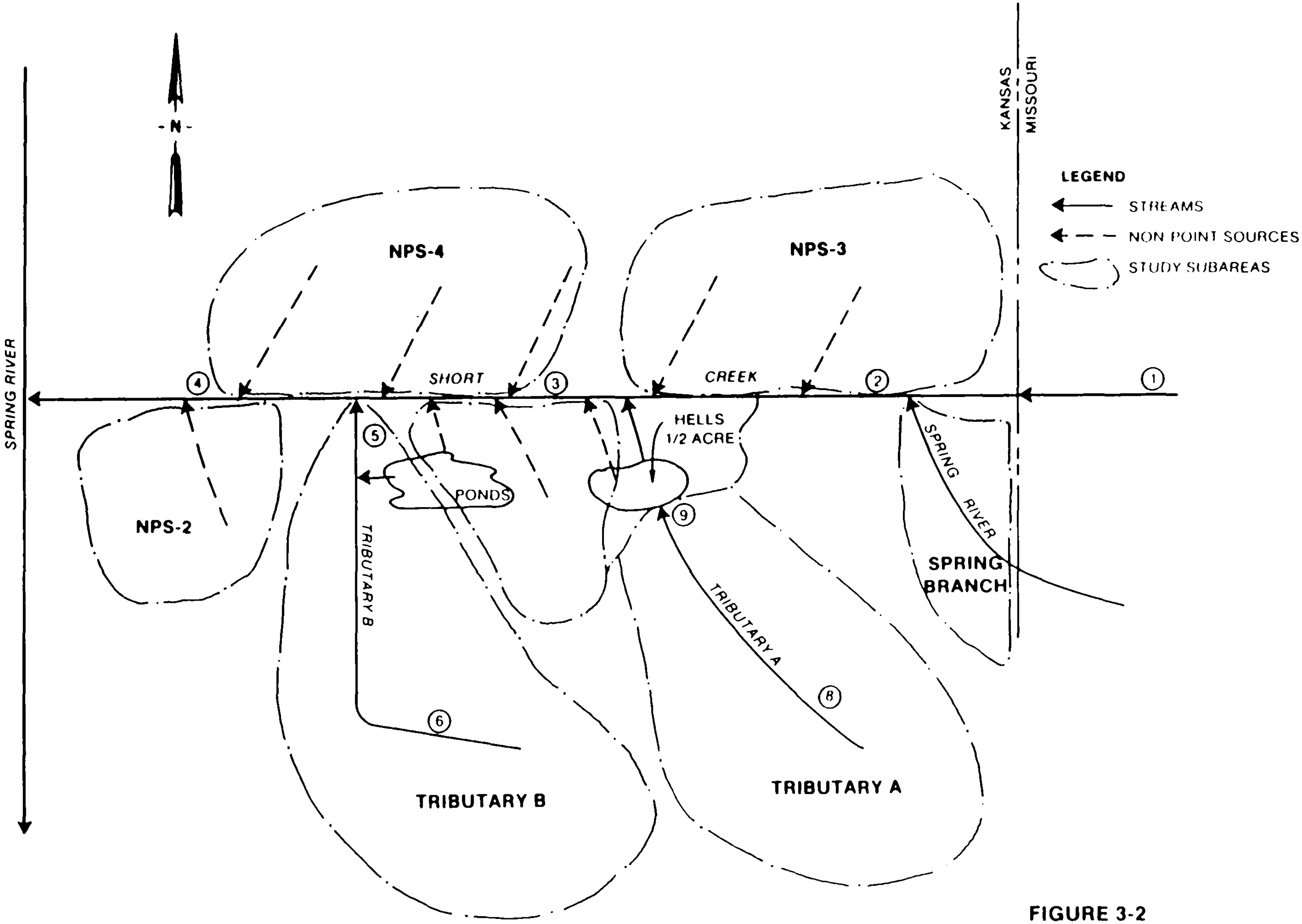


FIGURE 3-2
SHORT CREEK BASIN
OUFS SUBAREAS

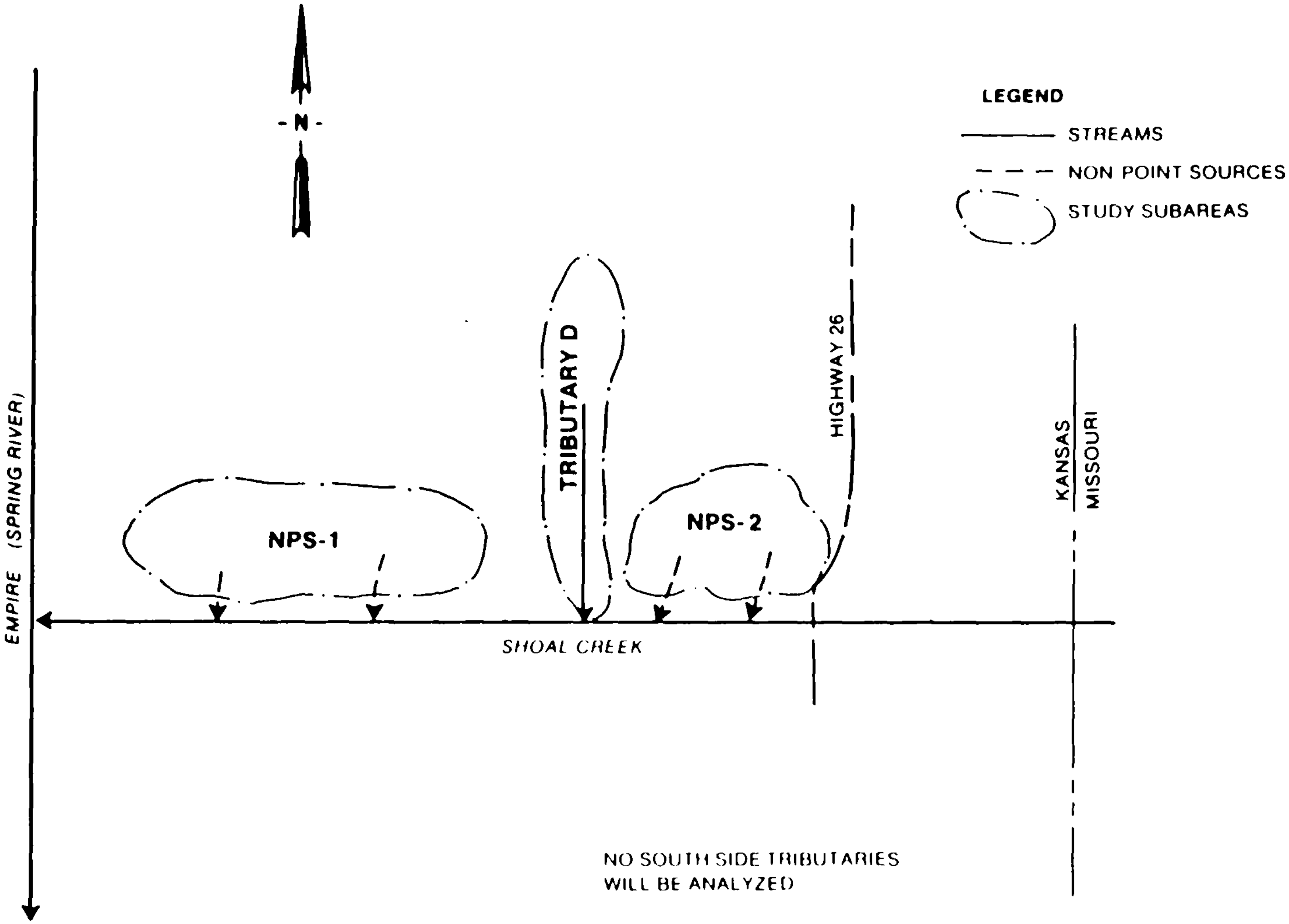


FIGURE 3-3
SHOAL CREEK BASIN
OUFS SUBAREAS

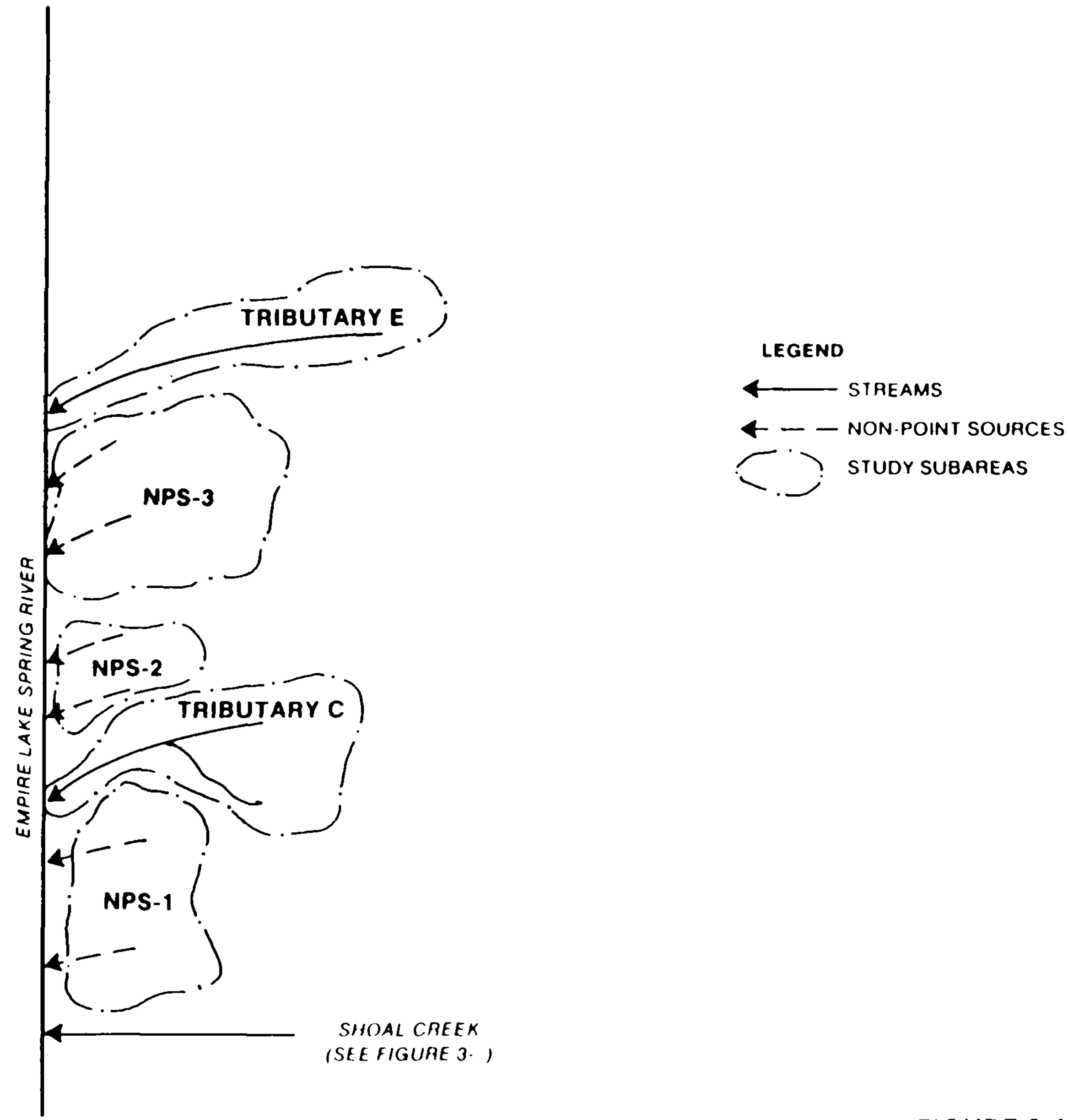


FIGURE 3-4
SPRING RIVER
OUFS SUBAREAS

with the development of clean-up objectives based on Federal and State identified ARAR's, and for coordinating our initial OUFS work with EPA, KDHE, and the U.S. Army Corps of Engineers (COE).

TASK RA--RISK ASSESSMENT

The objective of the risk assessment is to estimate the human health and environmental effects that may result if no remedial action is taken. The assessment will include an evaluation of existing and possible future uses of the site and contaminated areas. Where reasonably possible, the potential effects will be addressed in a quantitative analysis, but data limitations, including the present state of toxicological information, may allow only a qualitative assessment for some environmental pathways. This assessment will address the public health risks posed by surface water. The public health risks associated with groundwater use are being evaluated in the Groundwater OUFS.

REVIEW OF SITE SAMPLING RESULTS

The remedial investigation report, as well as other reports discussing site conditions and chemical concentrations, will be reviewed. This provides an opportunity for structuring the data for the assessment. It also provides an opportunity to identify the key chemicals from a risk assessment perspective.

RECEPTOR IDENTIFICATION

The health assessment will review the human populations at risk from the site chemical concentrations. Population characteristics for the area in and around the site will be examined. Local land uses will be addressed. The environmental assessment will address the effects of acid mine drainage and heavy metal contamination on the area's wildlife, critical habitats for wildlife, and the area's vegetation.

EXPOSURE ASSESSMENT

Major activities that will be addressed in this task include:

- Identify environmental pathways, primarily water transport mechanisms, that transport chemicals both offsite and to potential exposure points.

- Characterize qualitatively the environmental mechanisms of these pathways, including those that will alter the chemical concentrations within an environmental medium (dispersion, degradation, assimilation) and those that will moderate inter-media transfers (leaching and adsorption).

- o Estimate range of exposure point concentrations and human chemical intakes for chemicals of concern in surface waters.

This exposure assessment will be limited to the potential routes of water ingestion and dermal absorption.

TOXICITY EVALUATION

The quality of toxicity data available on different chemicals is very dependent on the specific chemical. This task will rely on existing EPA health effects assessments.

A summary of the ARAR's (such as maximum contaminant levels and ambient water quality criteria) and other criteria for the site chemicals and exposure pathways will be prepared. A summary of EPA reference doses and cancer potencies for site chemicals will also be prepared.

IMPACT EVALUATION

Data from the previous risk assessment tasks will be integrated in this task.

- o Compare estimated chemical exposures identified in the exposure assessment with the standards and criteria developed in the toxicity evaluation.
- o For the carcinogenic effects, the cancer potencies will be summarized, and excess lifetime cancer risk estimates will be provided where the chemical intakes were quantified in the exposure assessment for exposed or potentially exposed human populations.
- o For noncarcinogenic effects, the exposures estimated in the exposure assessment will be compared with the EPA reference doses.
- o For other significant chemicals, a qualitative description of potential effects will be provided.
- o Sources and effects of uncertainty will also be examined.

Federal ambient water quality criteria (AWQC) and appropriate state water quality criteria for freshwater aquatic species will be compared with the measured concentrations to assess potential impacts on fish.

REPORTS

The results of the above assessments will be incorporated into the OUFS report as a separate chapter (see Task R3). Following receipt of comments from EPA on the draft assessment section, a final version will be prepared for the OUFS report.

TASK GO--DEFINITION OF OUFS GOALS AND OBJECTIVES

The NCP states the general goal and objectives of remedial actions and defines the appropriate extent of remedies in 40 CFR 300.68(i): "The appropriate extent of remedy shall be determined by the lead agency's selection of a cost effective remedial alternative that effectively mitigates and minimizes threats to and provides adequate protection of public health and the environment."

With the above information in mind, the primary objective of the OUFS is to identify, develop, and evaluate remedial action alternatives that will protect the Cherokee County, Galena subsite surface water systems from heavy metal contamination. In this task, the short and long range goals of the Galena subsite surface water OUFS will be defined, including specific cleanup levels, ARAR's, and target areas.

ARAR development is expected to follow SARA requirements. Contaminant-specific ARAR's are expected to include review of federal drinking water standards, AWQC, and Kansas water quality criteria (KWQC). ARAR development will also be based on the type and location of remedial actions.

TASK DB--DATA BASE

EXISTING AND DEVELOPING DATA

Most of the site characterization data was developed in the Phase I RI, either by field investigations or from the literature. Additional existing information and data will be required for the technology screening and alternative development and evaluation. In addition, new data will be available from the federal and state agencies and from field activities performed in the spring and summer of 1987. These data will impact the development of both remedial alternatives and the ARAR's.

The recently published draft surface water technical memorandum summarized existing reports and analyzed selected metals data for exceedances of drinking water standards and AWQC (federal and state). This document provided an overview of the Cherokee County site and Galena subsite stream data.

IDENTIFIED DATA GAPS

Development and evaluation of remedial alternatives for this OUFS will require subbasin information within the Galena subsite. Remedial actions are expected to be formulated depending on characterization of the sources into point and nonpoint classifications.

A data gap identified previously is the lack of water quality and sediment transport data associated with the direct contributions of runoff from waste pile areas during periods of higher flows. Only a small amount of high flow data is available from the Phase I RI. Evaluation of alternatives dealing with mitigation of the surface runoff effects will be extremely difficult with the current data base. A high flow monitoring episode has been scheduled for some time but has not been accomplished due to the lack of a suitable precipitation event. These data will be collected during summer 1987 if a high flow event occurs.

A preliminary review of the subbasin data shows that, for Short Creek, data is available for Tributaries A and B and nonpoint source Area 1 (NPS-1) (refer to Figure 3-2). For Shoal Creek, data are available associated with the mined area south of Galena (Tributary D), and an upstream point at the Highway 26 bridge. No data are available for other small Shoal Creek tributaries (refer to Figure 3-3). Within the study area, Spring River data is limited to the Phase I RI data, and the September 1986 and January 1987 surveys.

The existing data are believed to be focused on those more important tributaries and nonpoint source areas most likely to be effected adversely by mining-related releases.

TASK DE--DATA EVALUATION

EVALUATION OF 1987 DATA

Data collected during ongoing activities will be analyzed for inclusion in this OUFS. Data validation is presumed to be performed under a separate task. Specific data expected to be analyzed in this task are:

- Records from 1987 gaging activities and water quality sampling on Short and Shoal Creeks (beginning in May 1987)
- Data from the waste pile characterization conducted in June and July 1987
- Data recently received from Pittsburg State University and the Missouri River Basin Plan

TASK AT--ALTERNATIVES TECHNOLOGY SCREENING

The remedial objectives identified for the Galena subsite surface water in Task GO will be addressed by each of several general response actions that will be developed in this task. General response actions are categories of response that might typically include actions such as containment, collection and diversion of runoff, on-site treatment, in situ treatment, offsite treatment, or provision for alternative water supply. Applicable general response actions will be developed to facilitate a comprehensive listing of appropriate technologies. The technologies identified by each general response action will then be screened for use as part of a remedial action alternative.

Screening will initially exclude from further consideration technologies whose use is clearly precluded by site or waste characteristics. For example, the technologies of capping and gas barriers, while both applicable to the general response action of containment, are not equally appropriate in the case of Galena because of site and waste characteristics. The technologies that remain after screening will contribute to achievement of the remedial objectives, or provide actions with significant positive health or environmental impacts in a reasonable time frame.

The capacity of the technology to reduce the mobility, toxicity, and/or volume of hazardous media on the site will be important criteria for the screening process. The level of detail to which the technologies will be screened will allow subsequent screening to concentrate on the effects of various alternatives, and not on the effects of individual technologies. A workshop will be conducted with EPA, COE, and KDHE to review the results of technology screening. The rationale for selecting various technologies will be clearly and concisely documented and presented during the workshop with EPA, COE, and KDHE.

GENERAL ASSESSMENT CRITERIA

Each technology will be evaluated according to compatibility of the technology with the Galena subsite physical and chemical waste characteristics, and the technical feasibility of meeting the remedial action objectives. In addition to meeting the remedial action objectives, technology screening includes a general assessment of effectiveness, demonstrated performance, reliability, implementability, compatibility and safety.

The effectiveness of a technology includes an assessment of its technical reliability, its ability to attain the ARAR's identified for the OUFS, its capability for protecting human health and the environment, and its capacity to reduce the toxicity, mobility, or volume of the contaminants under a given set of site conditions. The implementability of a technology includes the technical feasibility of that technology, its history of successful use, its availability, and the institutional and administrative limits of implementing it. Technologies surviving the technical screening criteria listed above will be further assessed, if necessary, based on the public health and environmental impacts the technology may have, its institutional impacts, and costs. Costs are used in the technology screening only for comparing technologies that attain the same or similar levels of protection, and the estimated costs are primarily based on general costs from experience at other sites or prior projects.

TASK AD--ALTERNATIVES: DEVELOPMENT AND SCREENING

The technologies and associated process options surviving screening will be assembled into remedial action alternatives. It is anticipated that 15 to 20 remedial alternatives will be developed for further analysis. The number and type of alternatives may vary depending on the characteristics of the subareas.

During the workshop with EPA, COE, and KDHE the preliminary set of remedial alternatives will be reviewed. A concurrence must be reached on the results of the technology screening process, and the preliminary set of remedial alternatives, before alternative screening is begun.

From the approximately 15 to 20 preliminary remedial action alternatives, a set of five to eight will remain for further evaluation after this task. Using data collected during the RI and in the previous tasks, the 15 to 20 remedial alternatives will be evaluated and compared. The criteria will be similar to those used in Task AT. In Task AT, however, the evaluation was of individual technologies. The concerns of this task are related solely to developing remedial alternatives and evaluating the effects of the various remedial alternatives. The level of detail necessary to allow comparison of the 15 to 20 alternatives in this task will be greater than in Task AT, but will still be largely conceptual in nature. The purpose of this task is to identify the most desirable alternatives for remediating the Galena subsite surface water.

The criteria for screening remedial alternatives will include performance, reliability, compatibility, implementability, safety, public health and environmental impacts, institutional constraints, and costs.

Performance

Performance will be assessed on the basis of effectiveness and useful life. Effectiveness is related to the degree to which the alternative will prevent or minimize release of hazardous substances to current or future receptors of an identified point of compliance. Useful life relates to the length of time that the level of effectiveness can be maintained or exceeded.

Reliability

Reliability will be assessed on the basis of operation and maintenance and demonstrated performance. Operation and maintenance are evaluated for labor availability, frequency, necessity, and complexity. Demonstrated performance includes proven performance, probability of failure, and pilot testing.

Compatibility

The compatibility of the alternative with the physical and chemical nature of the wastes will be assessed. Compatibility also will be based on the degree to which a given alternative can be employed with the potential final remedial action. Compatibility includes evaluating system expandability so that additional areas of contamination could be addressed in final remedial actions at Galena and throughout other applicable portions of the Cherokee County site.

Implementability

Implementability will be based on the ease of installation and length of time required to implement. Ease of installation is related to constructability, applicability to site conditions, influence of external conditions such as permits and access to offsite disposal facilities, and equipment availability. The time to implement and to achieve beneficial results are also evaluated.

Safety

Safety during construction and operation as well as safety upon failure of the alternative will also be assessed. This portion of the screening exercise will not entail extensive, detailed analysis by the project staff but will rely on the judgement of team members and their understanding of waste characteristics and the Galena subsite area.

Public Health

The remedial alternatives will be evaluated with respect to the degree to which public health risks are reduced and the degree to which they meet remedial action objectives. If data permits, health risk reduction will consider both short- and long-term effects. Alternatives will be evaluated based on the method of reduction (toxicity reduction, pathway or dose reduction, or volume reduction).

Environment

Environmental effects evaluation will consider reductions in toxic effects, pathways, and doses. Habitat alteration will be considered. If data permits, potential adverse environmental effects associated with specific remedial activities will be identified.

Institutional

Institutional impacts will be evaluated relative to surface water standards or criteria; air quality, odor, and noise standards; land acquisition, land use, and zoning regulations; and federal, state, or local laws or polices. Under SARA, with State agencies taking a key role in determining the appropriateness of remedial actions, KDHE representatives will be included as team members during scoping and decision-making meetings. Institutional issues may also include use of natural resources, alteration of transportation or other public facilities, and aesthetic changes.

Costs

Costs are used in the alternative screening for comparison only and reflect judgement based on experience at other sites. To distinguish among alternatives where public health, environmental, or institutional criteria are not significantly different, installation and operation costs will be estimated. These costs will be of relative accuracy and will not reflect actual construction or operating cost estimates. Screening cost estimates reflect relative rather than absolute costs because elements common among alternatives performing the same remedial function may not be included in the estimates.

To meet the objectives of the NCP, the remedial alternative screening process will retain at least one alternative in each of the following categories:

1. Alternatives for containment (onsite or offsite) and treatment or disposal at an off-site facility approved by EPA (i.e., currently meeting all applicable RCRA, TSCA, CWA, CAA, MPRSA, and SDWA regulations).

2. Alternatives that attain federal and state level ARAR's.

3. Alternatives that exceed ARAR's.

4. Alternatives that do not attain ARAR's, but will reduce the volume, toxicity, or mobility of the site contaminants. The intent for this category is to include alternatives which approach the level of protection provided by alternatives in Category 2.

5. The no action alternative.

6. Alternatives that include innovative technologies if there is reasonable belief that they offer potential for better performance, fewer or lesser adverse effects, or lower costs.

A revised draft NCP is expected soon which could change this minimum list of alternatives.

To meet the objectives of the SARA, alternatives that provide a permanent solution, reuse/reprocessing alternatives, and innovative technologies will be maintained where possible. Treatment alternatives should range from an alternative that, to the degree possible, would eliminate the need for long-term management of wastes at the site to alternatives that would reduce the toxicity, mobility, or volume as their principal element.

Task AD will include two meetings with EPA, COE, and KDHE to discuss the results and rationale of the alternative screening process. At the first meeting, five to eight remedial alternatives will be proposed for detailed evaluation.

A brief technical memorandum will be prepared following the above meeting, that summarizes the results of the screening process and defines the five to eight alternatives that will be subjected to detailed analyses. The second meeting with the EPA, COE, and KDHE will present the memorandum, review the remedial alternatives, and conclude the task.

TASK AE--ALTERNATIVES EVALUATION

Each remedial action alternative description will be conceptual but yet clearly summarized. For each of the five to eight potential alternatives, the description will include:

- o Preparation of a schematic plan diagram and conceptual layout of basic alternative components: design criteria, quantities of materials to be handled, potential efficiency of contaminant removal, and other basic information

- o A listing of required containment, removal, collection, treatment, or disposal technologies

- Major equipment needs and utility requirements

- Special engineering considerations

- Preliminary implementation considerations, long-term monitoring requirements, and schedules

- Length of operation and maintenance periods required to achieve objectives

DETAILED ENVIRONMENTAL EVALUATION

A detailed environmental analysis will be performed for each alternative. The following factors are to be addressed in this evaluation:

- Adverse or beneficial environmental impacts, including consideration of the alternative's effectiveness in mitigating adverse effects for both short- and long-term periods

- Site-specific physical, legal, and institutional constraints

- Public and environmental health assessment information (as available)

- CERCLA, SARA, and other regulatory compliance (as directed and identified by EPA, Region VII)

DETAILED ECONOMIC ANALYSIS

Capital, operating, and maintenance costs will be estimated for each potential Galena subsite alternative. These cost estimates will be as complete as possible within the constraints of the project descriptions and the data available on the Galena subsite.

A present-worth analysis will be prepared for each alternative. The alternatives can then be compared on an equal economic basis. A detailed summary of the cost estimates and present-worth analyses will be presented in an appendix to the OUFS Report.

Cost estimates for each alternative will be prepared considering cost data in the U.S. EPA's "Compendium of Costs of Remedial Technologies at Hazardous Waste Sites," the 1985 Means Site Work Cost Data guide, the Cost Reference Guide for Construction Equipment dated 1985, cost estimates for similar projects, and estimates provided by equipment vendors, publicly owned treatment works (POTW's), and hazardous waste transporters and treatment facilities. The costs will be order-of-magnitude level estimates, which requires that cost estimates have an expected accuracy of +50 and -30 percent. The estimated present-worth calculations for all remedial alternatives evaluated will be based on a 30-year period and 10-percent interest rate.

DETAILED TECHNICAL EVALUATION

The technical and engineering aspects for each alternative will be evaluated using the following criteria:

- o Performance, including effectiveness as a long-term solution to Galena subsite surface water problems and useful life of the solution
- o Reliability, including operation and maintenance requirements and demonstrated performance
- o Implementability, including time to construct and constructability
- o Practicality as a solution in meeting cleanup objectives for the Galena subsite and the Cherokee County site
- o Safety to the public and environment
- o Established or innovative technology
- o Suitability for control of the problem and for achievement of the remedial action goals and objectives

DETAILED INSTITUTIONAL ANALYSIS

The institutional aspects of each alternative are to be evaluated in the following areas:

- o CERCLA and SARA compliance with other environmental statutes, including State of Kansas and local government regulations and requirements
- o Compliance with the National Environmental Policy Act (NEPA), the NCP, and SARA
- o Coordination aspects with other agencies that may be involved with the project site
- o Community relations requirements

DETAILED PUBLIC HEALTH SCREENING

Public health issues will be evaluated for each alternative. These issues will also be discussed in the Risk Assessment section. The screening criteria include:

- Public Health Assessment data, if available, including risk assessment and exposure assessment information
- Comparison of appropriate alternatives to applicable or relevant environmental standards, advisories, or criteria; ability of each alternative to meet these standards, advisories, or criteria

TASK R3--PREPARATION OF OUFS REPORT

The results of Tasks GO through AE will be summarized and incorporated into a draft OUFS report. Topics to be included in the report are listed below:

- Introduction
- Site description and characterization
- Public health and environmental assessment
- Degree of cleanup
  - Identification of contaminant-specific and location-specific ARAR's
- Scoping of response actions and screening of associated technologies
- Development of alternatives
  - Identification of action-specific ARAR's
- Initial screening of alternatives
- Detailed analysis of alternatives
- Comparative summary of alternatives
- Community Relations Activities
- Appendixes

A comparison of the groundwater and surface water remedial alternatives will be included as an integral part of the summary. The alternatives will be compared within each evaluation category. Overall comparisons will be prepared to reflect all categories. Procedures specified in the "Superfund Feasibility Study Guidance Document" and other available new documents, such as the December 24 Interim Guidance on Superfund Selection of Remedy, will be used as guidance. Comparisons will be based on the findings of the detailed evaluations and professional judgment, and will reflect input from EPA, State of Kansas, local governments, and eventually the potentially responsible parties (PRP's) and the public.

Specific attention will be directed toward analyzing the compatibility of each Galena subsite surface water system alternative with the final response actions for the other portions of the Cherokee County site. Compatibility review will be related directly to each alternative's flexibility for future expansion and how well the alternative achieves or assists in reaching, to the extent practical, the remedial goals at Galena and sitewide. The final determination of the preferred alternative will be made by EPA.

A draft OUFS Report will be prepared, subjected to a senior project staff review, and submitted to EPA for review by EPA, KDHE, and the COE. The project staff will prepare a Final-Draft, incorporating all appropriate review comments. After approval, EPA will submit the Final-Draft report to the PRP's, the public, and interested parties for their review and comment. The report documents should provide adequate support for the EPA's needs during the public comment period before the development of the record of decision (ROD).

Technical support to the EPA will be provided during development of the responsiveness summary and the ROD. The Task RS, which is described on Page 4-6, details that support.

Section 4
MANAGEMENT ACTIVITIES

The schedule, cost estimates, and project deliverables will depend on support from EPA Region VII (for example, development of goals and definition of ARAR's) and are subject to the limitations and assumptions described in the previous section.

SCHEDULE

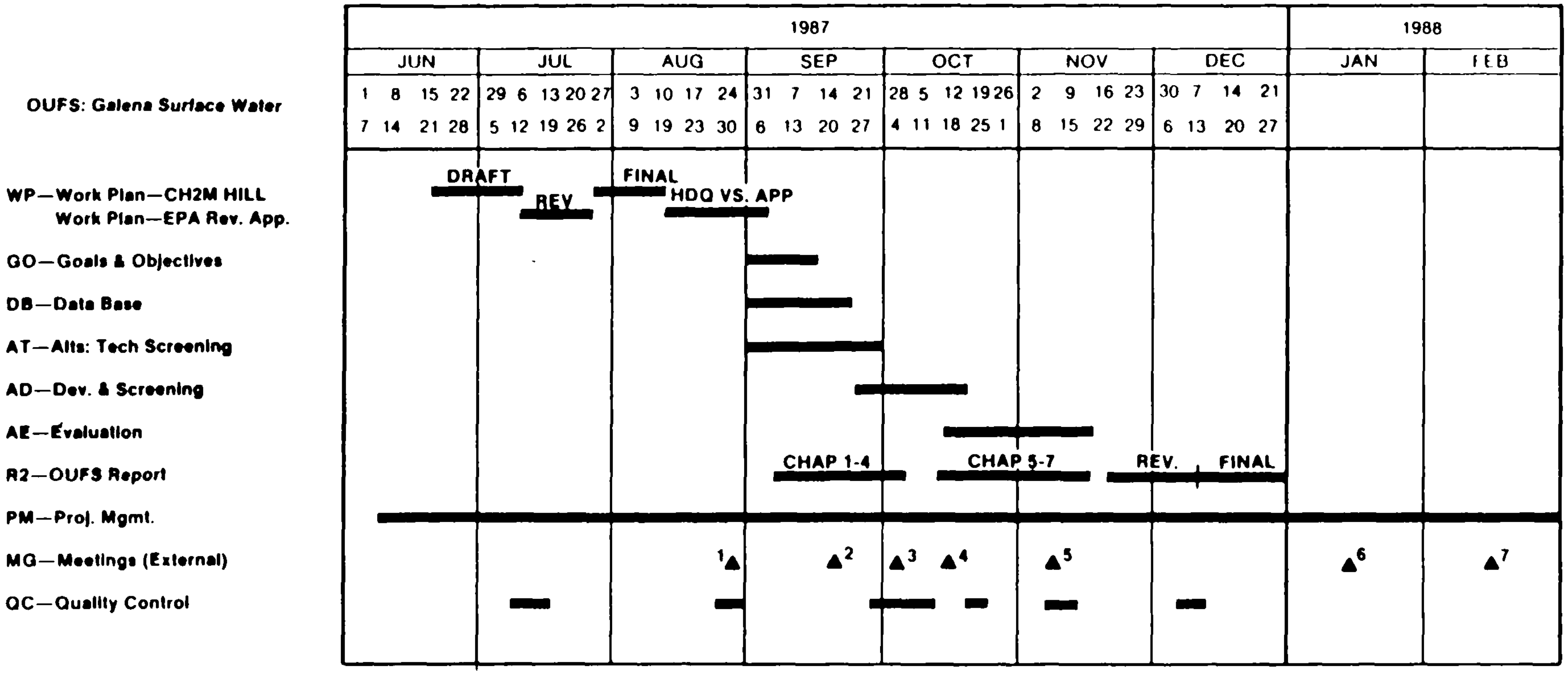
The project schedule is presented in Figure 4-1. Draft and final project deliverables are indicated on the schedule and in Table 4-1. Critical project meetings between project staff, EPA, and KDHE are shown in Figure 4-1. Since the project is scheduled on a fast-track basis, any delays due to interested party negotiations, extended EPA review periods, or other unforeseen circumstances will influence the project deliverable dates and the target date of December 31, 1987 for delivery of the surface water OUFS to EPA.

PROJECT DELIVERABLES

Project deliverables are listed in Table 4-1, with estimated due dates.

Table 4-1
PROJECT DELIVERABLES

Deliverables	Due Date
Draft Work Plan for EPA Review	July 10, 1987
Final Work Plan Approved by EPA	August 21, 1987
OUFS Goals and ARAR's Defined	September 4, 1987
Preliminary Screening of Remedial Technologies	September 25, 1987
OUFS Alternatives List for Detailed Analysis	October 19, 1987
Draft OUFS Report	November 30, 1987
Final Draft OUFS Report	December 31, 1987



Note
Meetings in Kansas City
1 EPA, Finalize goals & objectives
2 EPA, Technology screening
3 EPA, Alternative screening
4 EPA, KDHE, COE Alternative screening
5 EPA, Detailed evaluation of alts
6 Public meeting alternative
7 EPA Public & PRP response

FIGURE 4-1
GALENA SUBSITE SURFACE WATER OUFS SCHEDULE

BUDGET

The budget estimate for the Galena subsite surface water OUFS, including estimated fee, is shown in the following tables. Table 4-2 presents labor and expense estimates for each task, and the PRJ210 reports provide cost detail for each task.

TASK QC--QUALITY CONTROL

The Project Quality Control task is undertaken to assist the site manager (SM) in achieving the project objectives and in producing quality project deliverables. The task is accomplished by integrating a review team of senior professionals experienced in similar types of AMD and CERCLA mining projects. To be effective, the review team members must be involved in project planning and coordination from the beginning of the OUFS process through completion, and be available for review of deliverables.

Review team members will be involved in several key activities and will:

- Participate in the conceptualization of the OUFS approach
- Provide technology transfer based on their experience with other projects, such as the California Gulch Site
- Review draft and final report deliverables
- Participate in OUFS progress meetings
- Audit progress on the work and participate in major project decisions

Review team members have been selected by the site manager, the regional manager (RM), and the assistant zone project manager-technology. The review team members for the Galena Subsite Surface Water OUFS will include a mining engineer, a groundwater hydrogeologist, a surface water hydrologist, and water and wastewater treatment specialists. Documents that will be reviewed by team members for this OUFS include the EPA work plan; draft and final OUFS reports; technical memos; and technology screening and alternatives development summaries and plans. Specific review requirements will be coordinated with the RM, the review team leader, and related disciplines.

Table 4-2
ESTIMATED COSTS FOR SURFACE WATER OUFS AT THE GALENA SUBSITE
CHEROKEE COUNTY SITE, KANSAS

TASK Code	Description	Status	-Project To Date- Prof. Hours	Total Cost	-Est To Complete- Prof. Hours	Total Cost	-Est At Complete- Prof. Hours	Total Cost	Budget Prof. Hours	Total Cost
GALENA - OUFS Surface Water: W65542										
CR	Community Relations Implementation	P	0	0	66	9142	66	9142	0	0
DE	Data Evaluation	P	0	0	44	2902	44	2902	0	0
MM	Project Management-Total Program	P	0	0	264	30025	264	30025	0	0
PH	Public Health/Environmental Assessment	P	0	0	214	16521	214	16521	0	0
PM	Project Management	P	0	0	280	25494	280	25494	0	0
QC	Quality Control	P	0	0	160	19625	160	19625	0	0
RS	Responsiveness Summary	P	0	0	144	13653	144	13653	0	0
ED	Existing Data Review	A	262	16728	48	4974	310	21702	63	7532
WP	EPA Workplan	A	195	12693	137	14801	332	27494	109	9149
GO	Goals & Objectives	P	0	0	104	9043	104	9043	0	0
DB	Data Base	P	0	0	116	6690	116	6690	0	0
AT	Alternatives - Technology Screening	P	0	0	118	8306	118	8306	0	0
AD	Alternatives - Development & Screening	P	0	0	359	25202	359	25202	0	0
AE	Alternatives - Evaluation	P	0	0	464	33855	464	33855	0	0
R2	Report - 1st Draft RI Report	P	0	0	324	31433	324	31433	0	0
		Total	457	29421	2882	251666	3339	281087	192	16681
		Master Project Total	457	29421	2882	251666	3339	281087	192	16681

TASK PM--ACTIVITY MANAGEMENT

The surface water OUFS activity manager is responsible for budget and schedule control and technical reporting. Functions to be performed as part of activity management include:

- o Developing the work plan and schedule
- o Meeting with the SM and EPA, if necessary, to discuss and finalize OUFS plans and schedule
- o Assisting the SM in selecting staff and coordinating the schedule for tasks within this OUFS activity
- o Monitoring the involvement and performance of OUFS in-house staff and subcontractors
- o Monitoring project performance and providing day-to-day guidance of the activity, including updates of the schedules and manpower requirements, as well as participating in and influencing technical issues
- o Preparing monthly technical status reports
- o Coordinating all other project activities
- o Scheduling internal meetings with project staff

The activity manager is also responsible for quality assurance and control of the surface water OUFS. Quality assurance entails a number of specific activities and procedures and these duties will be shared by the activity manager, the site manager, and the senior review team. Quality assurance reviews of work completed by team members will be conducted to provide technical and managerial guidance, as needed, to maintain the quality and efficiency of project performance.

The cost estimates for this Galena Surface Water OUFS include the management costs required to complete this particular activity (see Task PM in Table 4-2), plus 3 months of cost towards management of the entire RI/FS project (see Task MM in Table 4-2). Funds for the first 6 months (October 1986-March 1987) of project management for the entire project were included within the Interim Authorization budget already approved by EPA. Funds for management of the entire project for the next 9 months (April through December 1987) have been divided into 3-month blocks; the first 3-month block was included in the Surface and Subsurface Hydrology Work Plan. The second 3-month block was included in the Groundwater OUFS Work Plan. The last 3-month block is included in this work plan.

Tasks required for management of the surface water OUFS activity include such things as planning and staffing the activity, controlling the technical direction of the study, estimating and tracking activity costs, managing equipment procurement, reporting status and plans to the SM, and maintaining liaison with EPA. In contrast, some of the tasks required for management of the entire project include preparing monthly technical and financial reports, attending monthly meetings and conference calls with EPA and the PRP's, directing technical aspects of the project, maintaining the proper interaction between all of the project activities, controlling costs, and maintaining technical quality.

TASK RS--RESPONSIVENESS SUMMARY AND ROD

Region VII may receive numerous comments to the Final Draft OUFS Report for Galena subsite surface water. Several of the comments, which might come from individuals, PRP's, public interest groups, various industries, governmental entities, and other groups, will probably focus on technical issues related to the OUFS. CH2M HILL, at EPA's request, will assist Region VII in preparing the final responsiveness summary (especially responses to technical issues) upon receipt of the questions/comments to be addressed. Activities that might potentially be undertaken as part of the CH2M HILL assistance may include document and public record review, report preparation, distribution of documents, and attendance at or preparation for briefings and meetings not anticipated as part of other OUFS activities.

The extent of CH2M HILL's participation with EPA on this task is not defined at this point. With this in mind, eighty (80) hours of senior technical staff time has been budgeted, along with limited graphics and secretarial support (40 hours), to allow for that level of assistance to Region VII.

The record of decision will be written by EPA which will set forth the chosen remedial action or combination of remedial actions to be designed and implemented. A limited CH2M HILL budget has been established to provide assistance to EPA during the development of the ROD. Examples of ROD technical support might include answering questions on the OUFS for Galena subsite surface water, reviewing the technical content of the ROD documents, and assisting EPA staff in preparing briefing materials or visual aids. A total of forty (40) professional labor hours and sixteen (16) labor hours for graphics and word processing are included in the cost estimate figures.

TASK CR--COMMUNITY RELATIONS

EPA Region VII has requested limited technical support at the public meeting in Galena that will occur near the end of the public comment period. The SM and one community relations specialist will attend the meeting to assist EPA. The SM will brief the community relations person concerning technical issues and project history prior to the meeting. Also, a local service will be subcontracted to provide an official transcript of the meeting. The community relations (CR) specialist will take notes at the public meeting and prepare a summary of the comments immdiately following the meeting. This CR task includes the travel budget for the SM and CR specialist, cost for the meeting transcript, and labor for preparing for and attending the public meeting and preparing the summary of comments.

Section 5
REFERENCES

EPA (1986a). Final Draft, Phase I Remedial Investigation Report, Cherokee County Galena Subsite. EPA WA No. 127.7LB9.0(013). April 23, 1986.

EPA (1986b). Draft Technical Memorandum on Existing Surface Water Hydrology Data. EPA WA No. 102-7L37.0(001). December 24, 1986.

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